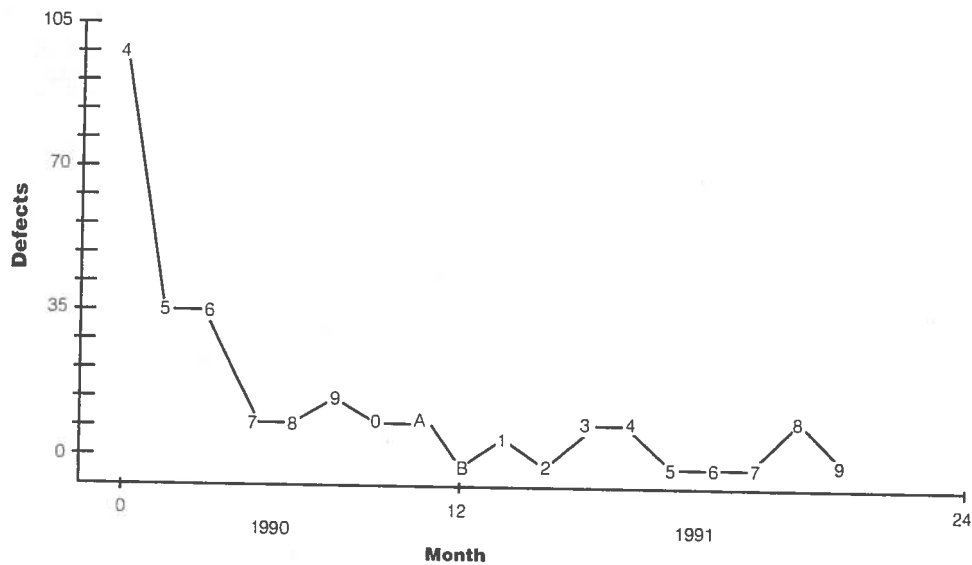


Figure 1.8 Chart of Number of Defects/Month

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QUALITY IN PRACTICE

THE EVOLUTION OF QUALITY AT XEROX: FROM LEADERSHIP THROUGH QUALITY TO LEAN SIX SIGMA³⁶

The Xerox 914, the first plain-paper copier, was introduced in 1959. Regarded by many people as the most successful business product ever introduced, it created a new industry. During the 1960s Xerox grew rapidly, selling all it could produce, and reached \$1 billion in revenue in record-setting time. By the mid-1970s its return on assets was in the low 20 percent range. Its competitive advantage was due to strong patents, a growing market, and little competition. In such an environment management was not pressed to focus on customers.

Facing a Competitive Crisis

During the 1970s, however, IBM and Kodak entered the high-volume copier business—Xerox's

principal market. Several Japanese companies introduced high-quality low-volume copiers, a market that Xerox had virtually ignored, and established a foundation for moving into the high-volume market. In addition, the Federal Trade Commission accused Xerox of illegally monopolizing the copier business. After negotiations, Xerox agreed to open approximately 1,700 patents to competitors. Xerox was soon losing market share to Japanese competitors, and by the early 1980s it faced a serious competitive threat from copy machine manufacturers in Japan; Xerox's market share had fallen to less than 50 percent. Some people even predicted that the company would not survive. Rework, scrap, excessive inspection, lost business, and other problems were estimated

to be costing Xerox more than 20 percent of revenue, which in 1983 amounted to nearly \$2 billion. Both the company and its primary union, the Amalgamated Clothing and Textile Workers, were concerned. In comparing itself with its competition, Xerox discovered that it had nine times as many suppliers, twice as many employees, cycle times that were twice as long, 10 times as many rejects, and seven times as many manufacturing defects in finished products. It was clear that radical changes were required.

Leadership Through Quality

In 1983 company president David T. Kearns became convinced that Xerox needed a long-range, comprehensive quality strategy as well as a change in its traditional management culture (see Figure 1.9). Kearns was aware of Japanese subsidiary Fuji Xerox's success in implementing quality-management practices and was approached by several Xerox employees about instituting total quality management. He commissioned a team to outline a quality strategy for Xerox. The team's report stated that instituting it would require changes in behav-

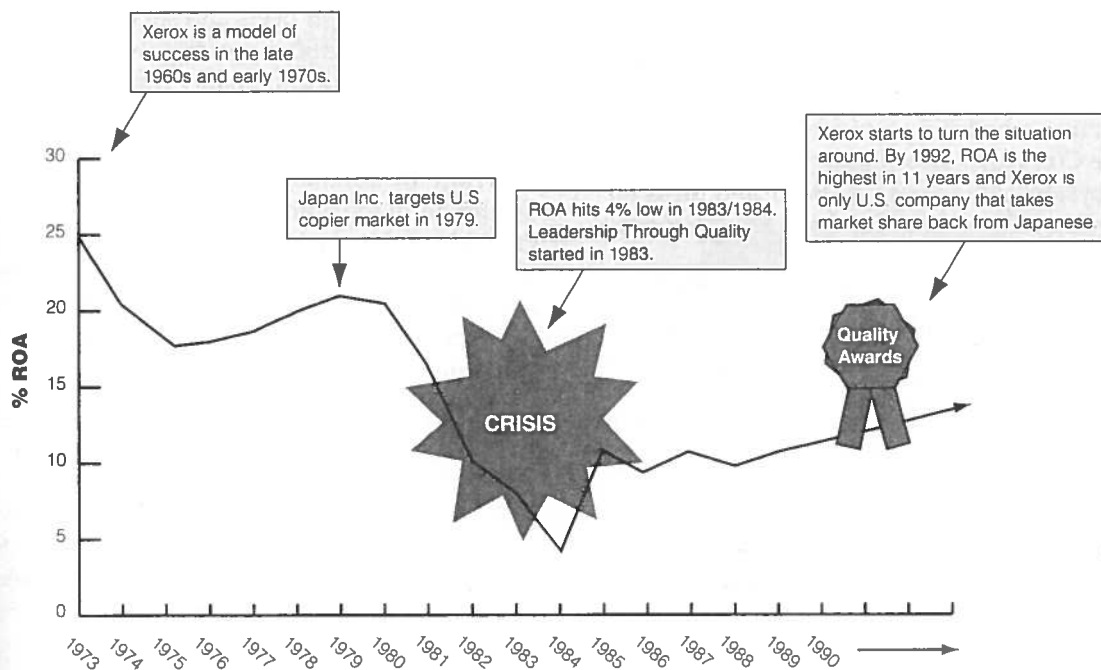
iors and attitudes throughout the company as well as operational changes in the company's business practices. Kearns determined that Xerox would initiate a total quality management approach, that they would take the time to "design it right the first time," and that the effort would involve all employees. Kearns and the company's top 25 managers wrote the Xerox Quality Policy, which states:

Xerox is a quality company. Quality is the basic business principle for Xerox. Quality means providing our external and internal customers with innovative products and services that fully satisfy their requirements. Quality improvement is the job of every Xerox employee.

This policy led to a process called Leadership Through Quality, which had three objectives:

1. To instill quality as the basic business principle in Xerox, and to ensure that quality improvement becomes the job of every Xerox person.
2. To ensure that Xerox people, individually and collectively, provide our external and

Figure 1.9 Origin of the 1983 Xerox Quality Imperative



internal customers with innovative products and services that fully satisfy their existing and latent requirements.

3. To establish, as a way of life, management and work processes that enable all Xerox people to continuously pursue quality improvement in meeting customer requirements.

In addition, Leadership Through Quality was directed at achieving four goals in all Xerox activities:

- *Customer Goal:* To become an organization with whom customers are eager to do business.
- *Employee Goal:* To create an environment where everyone can take pride in the organization and feel responsible for its success.
- *Business Goal:* To increase profits and presence at a rate faster than the markets in which Xerox competes.
- *Process Goal:* To use Leadership Through Quality principles in all Xerox does.

Leadership Through Quality radically changed the way Xerox did business. All activities, such as product planning, distribution, and establishing unit objectives, began with a focus on customer requirements. Benchmarking—identifying and studying the companies and organizations that best perform critical business functions and then incorporating those organizations' ideas into the firm's operations—became an important component of Xerox's quality efforts. Xerox benchmarked more than 200 processes with those of noncompetitive companies. For instance, ideas for improving production scheduling came from Cummins Engine Company, ideas for improving the distribution system came from L.L. Bean, and ideas for improving billing processes came from American Express.

Measuring customer satisfaction and training were important components of the program. Every month, 40,000 surveys were mailed to customers, seeking feedback on equipment performance, sales, service, and administrative support. Any reported dissatisfaction was dealt with immediately and was usually resolved in a matter of days. When the program was instituted, every Xerox employee worldwide, and at all levels of the company, received the same training in quality principles. This training began with top management and filtered down through each level of the

firm. Five years, 4 million labor-hours, and more than \$125 million later, all employees had received quality-related training. In 1988 about 79 percent of Xerox employees were involved in quality improvement teams.

Several other steps were taken. Xerox worked with suppliers to improve their processes, implement statistical methods and a total quality process, and to support a just-in-time inventory concept. Suppliers that joined in these efforts were involved in the earliest phases of new product designs and rewarded with long-term contracts.

Employee involvement and participation was also an important effort. Xerox had always had good relationships with its unions. In 1980 the company signed a contract with its principal union, the Amalgamated Clothing and Textile Workers, encouraging union members' participation in quality improvement processes. It was the first program in the company that linked managers with employees in a mutual problem-solving approach and served as a model for other corporations. A subsequent contract included the provision that "every employee shall support the concept of continuous quality improvement while reducing quality costs through teamwork."

Most important, management became the role model for the new way of doing business. Managers were required to practice quality in their daily activities and to promote Leadership Through Quality among their peers and subordinates. Reward and recognition systems were modified to focus on teamwork and quality results. Managers became coaches, involving their employees in the act of running the business on a routine basis.

From the initiation of Leadership Through Quality until the point at which Xerox's Business Products and Systems organization won the Malcolm Baldrige National Quality Award in 1989, some of the most obvious impacts of the Leadership Through Quality program included the following:

1. Reject rates on the assembly line fell from 10,000 parts per million to 300 parts per million.
2. Ninety-five percent of supplied parts no longer needed inspection; in 1989, 30 U.S. suppliers went the entire year defect-free.
3. The number of suppliers was cut from 5,000 to fewer than 500.

4. The cost of purchased parts was reduced by 45 percent.
5. Despite inflation, manufacturing costs dropped 20 percent.
6. Product development time decreased by 60 percent.
7. Overall product quality improved 93 percent.

Xerox learned that customer satisfaction plus employee motivation and satisfaction resulted in increased market share and improved return on assets. In 1989 president David Kearns observed that quality is "a race without a finish line."

Crisis and Quality Renewal

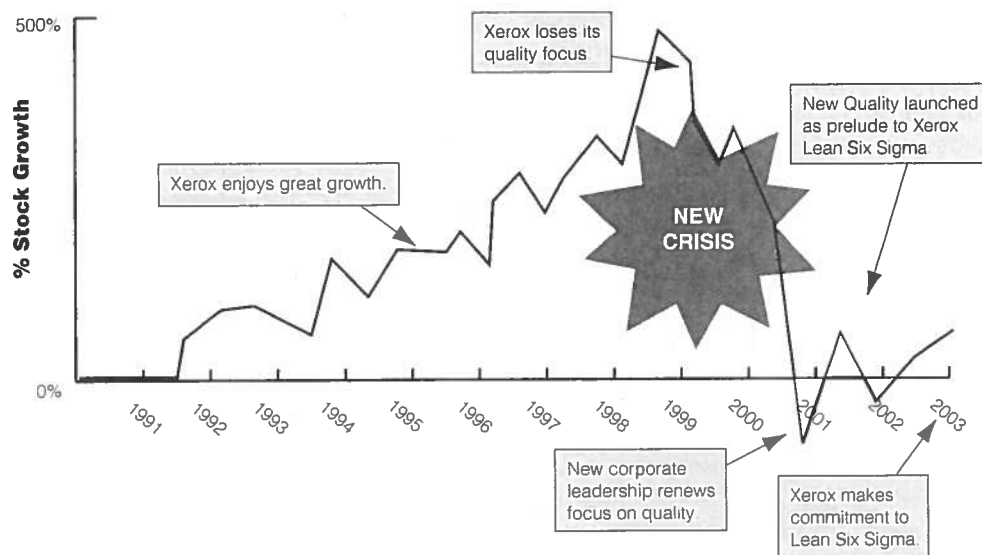
Throughout the 1990s, Xerox grew at a steady rate. However, at the turn of the century, the technology downturn, coupled with a decreased focus on quality by top corporate management, resulted in a significant stock price drop and a new crisis (see Figure 1.10). A top management shake-up, resulting in new corporate leadership, renewed the company's focus on quality, beginning with "New Quality" in 2001 and leading to the current "Lean Six Sigma" initiative.

The New Quality philosophy built on the quality legacy established in the 1983 Leadership

Through Quality process. Soon afterward, as Six Sigma became more popular across the United States, this approach was refined around a structured, Six Sigma-based improvement process with more emphasis on behaviors and leadership to achieve performance excellence. The new thrust, established in 2003 and called "Lean Six Sigma" (see Chapter 10 for a detailed discussion), includes a dedicated infrastructure and resource commitment to focus on key business issues: critical customer opportunities, significant training of employees and "black belt" improvement specialists, a value-driven project selection process, and an increased customer focus with a clear linkage to business strategy and objectives. The basic principles support the core value "We Deliver Quality and Excellence in All We Do" and are stated as:

- Customer-focused employees, accountable for business results, are fundamental to our success.
- Our work environment enables participation, speed, and teamwork based on trust, learning, and recognition.
- Everyone at Xerox has business objectives aligned to the Xerox direction. A disciplined process is used to assess progress towards delivery of results.

Figure 1.10 Restrengthening Quality to Address a New Crisis



- Customer-focused work processes, supported by disciplined use of quality tools, enable rapid changes and yield predictable business results.
- Everyone takes responsibility to communicate and act on benchmarks and knowledge that enable rapid change in the best interests of customers and shareholders.

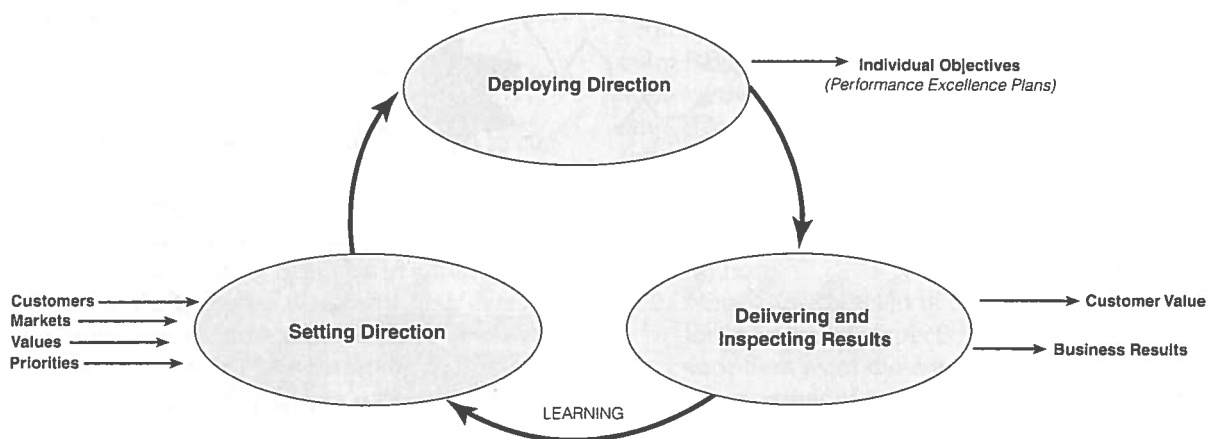
The key components of Xerox's Lean Six Sigma are as follows:

1. Performance excellence process
 - Supports clearer, simpler alignment of corporate direction to individual objectives
 - Emphasizes ongoing inspection/assessment of business priorities
 - Clear links to market trends, benchmarking, and Lean Six Sigma
 - Supports a simplified "Baldrige-type" business assessment model
2. DMAIC (define, measure, analyze, improve, control) process
 - Based on industry-proven Six Sigma approach with speed and focus
 - Four steps support improvement projects, set goals
 - Used to proactively capture opportunities or solve problems
 - Full set of lean and Six Sigma tools
3. Market trends and benchmarking
 - Reinforces market focus and encourages external view

- Disciplined approach to benchmarking
 - Establishes a common four-step approach to benchmarking
 - Encourages all employees to be aware of changing markets
 - Strong linkage to performance excellence process and DMAIC
4. Behaviors and leadership
 - Reinforces customer focus
 - Expands interactive skills to include more team effectiveness
 - Promotes faster decision making and introduces new meeting tool
 - Supports leadership skills required for transition and change

The heart of Xerox's Lean Six Sigma is the performance excellence process, illustrated in Figure 1.11. It consists of three phases: setting direction, deploying direction, and delivering and inspecting results. It starts at the top of the organization—even the chair and CEO, Anne Mulcahy, has an individual performance excellence plan with objectives that are aligned with organization goals and measures and targets for assessment. This approach provides clear communication of direction and accountability for objectives. A structured approach is used to prioritize and select projects that have high benefits relative to the effort involved in accomplishing them. Statistical methods, lean work flow methods, and other process management skills are used to drive

Figure 1.11 Xerox Performance Excellence Process



improvement from a factual, objective basis, driven by the DMAIC methodology.

Market trends and benchmarking help provide an external perspective required to lead the market with innovative products, services, and solutions and add value to the customer experience. This component encourages all people to share information and knowledge that enables changes in the best interest of customers and shareholders. Finally, behaviors and leadership reinforce customer-focused behaviors, based on the principle that "Quality is the responsibility of every Xerox employee."

In 2003, Xerox trained more than 1,000 senior leaders across the company and communicated this business approach, the key differences from their quality legacy, and expectations to every employee, and is rapidly moving Lean Six Sigma concepts from manufacturing and supply chain into all business areas. They recognize that full

leadership commitment is the key ingredient. As Anne Mulcahy noted, "What I worry most about is how to return Xerox to greatness. . . . Lean Six Sigma is not the only answer, but it's a significant part of the equation."

Key Issues for Discussion

1. Contrast Leadership for Quality and Lean Six Sigma as quality initiatives for Xerox. How did their motivations differ? What differences or similarities are evident in the principles behind these initiatives and the way in which they were implemented?
2. What lessons might this experience—particularly in responding to the new crisis—have for other organizations?
3. Discuss the meaning of "Quality is a race without a finish line." What is its significance to Xerox, or to any organization?



QUALITY IN PRACTICE

BRINGING TOTAL QUALITY PRINCIPLES TO LIFE AT KARLEE³⁷

KARLEE is a contract manufacturer of precision sheet metal and machined components for telecommunications, semiconductor, and medical equipment industries, located in Garland, Texas. KARLEE provides a vertically integrated range of services that support customers from initial component design to a finished, assembled product. Their services include:

- Advanced design engineering support
- Prototype production
- Manufacture and assembly of precision machined and sheet metal fabricated products
- Product finishing (painting, silk screening, plating)
- Value-added assembly integration (cabling, power supply and back plane installation, and electrical testing)

KARLEE exemplifies the principles of total quality that we introduced in this chapter in a number of ways, which are discussed next.



Customer and Stakeholder Focus

KARLEE made a strategic decision to carefully select customers that support their values, which include a systematic approach to business and performance management, a desire for long-term partnerships, and being a global leader. Senior executives work with each customer to establish current requirements and future needs, and each customer is assigned a two-person customer service team that is on call 24 hours a day for day-to-day production issues. One member is an estimator who provides quotes for the customer. The second member is a customer service representative (CSR) who provides liaison support in communicating delivery, scheduling, order entry, and other requested information. The customer service representatives for three of KARLEE's primary customers provide on-site support, spending two to three days a week to full time at the customer site. KARLEE uses a mobile phone system that includes voice-mail, e-mail, and radio